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Sequence Listing was accepted.

If you need help call the Patent Electronic Business Center at (866)  
217-9197 (toll free).

Reviewer: Keisha Douglas

Timestamp: Thu Aug 30 14:10:38 EDT 2007

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Application No: 10784300 Version No: 3.0

Input Set:

Output Set:

Started: 2007-08-20 07:36:47.213  
Finished: 2007-08-20 07:36:48.193  
Elapsed: 0 hr(s) 0 min(s) 0 sec(s) 980 ms  
Total Warnings: 5  
Total Errors: 0  
No. of SeqIDs Defined: 11  
Actual SeqID Count: 11

| Error code | Error Description                                   |
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| W 213      | Artificial or Unknown found in <213> in SEQ ID (2)  |
| W 213      | Artificial or Unknown found in <213> in SEQ ID (3)  |
| W 213      | Artificial or Unknown found in <213> in SEQ ID (9)  |
| W 213      | Artificial or Unknown found in <213> in SEQ ID (10) |

# SEQUENCE LISTING

<110> BLACK, Roy A.  
 PAXTON, Raymond J.  
 BODE, Wolfram  
 NASKOS, Klaus  
 FERNANDEZ-CATALAN, Carlos  
 CHEN, James Ming  
 LEVIN, Jeremy Ian

<120> Crystalline TNF-alpha-converting enzyme  
 and uses thereof

<130> 16163-039004

<140> 10784300

<141> 2004-02-24

<150> US 09/244,984

<151> 1999-02-04

<150> US 60/073,709

<151> 1998-02-04

<150> US 60/135,499

<151> 1998-03-30

<150> US 60/117,476

<151> 1999-01-27

<160> 11

<170> FastSEQ for Windows Version 4.0

<210> 1

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<212> PRT

<213> Artificial Sequence

<220>

<223> Illustrative peptide

<400> 1

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<400> 2

Gly Ser His His His His His His

1 5

<210> 3

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<223> Consensus motif

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<221> VARIANT

<222> 3, 4, 6, 7, 9, 10

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His Glu Xaa Xaa His Xaa Xaa Gly Xaa Xaa His

1 5 10

<210> 4

<211> 203

<212> PRT

<213> Crotalus adamanteus

<400> 4

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1 5 10 15

Arg Arg Val Phe Met Lys Tyr Asn Ser Asp Leu Asn Ile Ile Arg Thr

20 25 30

Arg Val His Glu Ile Val Asn Ile Ile Asn Glu Phe Tyr Arg Ser Leu

35 40 45

Asn Ile Arg Val Ser Leu Thr Asp Leu Glu Ile Trp Ser Gly Gln Asp

50 55 60

Phe Ile Thr Ile Gln Ser Ser Ser Ser Asn Thr Leu Asn Ser Phe Gly

65 70 75 80

Glu Trp Arg Glu Arg Val Leu Leu Thr Arg Lys Arg His Asp Asn Ala

85 90 95

Gln Leu Leu Thr Ala Ile Asn Phe Glu Gly Lys Ile Ile Gly Lys Ala

100 105 110

Tyr Thr Ser Ser Met Cys Asn Pro Arg Ser Ser Val Gly Ile Val Lys

115 120 125

Asp His Ser Pro Ile Asn Leu Leu Val Ala Val Thr Met Ala His Glu

130 135 140

Leu Gly His Asn Leu Gly Met Glu His Asp Gly Lys Asp Cys Leu Arg

145 150 155 160

Gly Ala Ser Leu Cys Ile Met Arg Pro Gly Leu Thr Pro Gly Arg Ser

165 170 175

Tyr Glu Phe Ser Asp Asp Ser Met Gly Tyr Tyr Gln Lys Phe Leu Asn

180 185 190

Gln Tyr Lys Pro Gln Cys Ile Leu Asn Lys Pro

195 200

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 Arg Tyr Met Gly Arg Gly Glu Glu Ser Thr Thr Thr Asn Tyr Leu Ile  
 35 40 45  
 Glu Leu Ile Asp Arg Val Asp Asp Ile Tyr Arg Asn Thr Ser Trp Asp  
 50 55 60  
 Asn Ala Gly Phe Lys Gly Tyr Gly Ile Gln Ile Glu Gln Ile Arg Ile  
 65 70 75 80  
 Leu Lys Ser Pro Gln Glu Val Lys Pro Gly Glu Lys His Tyr Asn Met  
 85 90 95  
 Ala Lys Ser Tyr Pro Asn Glu Glu Lys Asp Ala Trp Asp Val Lys Met  
 100 105 110  
 Leu Leu Glu Gln Phe Ser Phe Asp Ile Ala Glu Glu Ala Ser Lys Val  
 115 120 125  
 Cys Leu Ala His Leu Phe Thr Tyr Gln Asp Phe Asp Met Gly Thr Leu  
 130 135 140  
 Gly Leu Ala Tyr Val Gly Ser Pro Arg Ala Asn Ser His Gly Gly Val  
 145 150 155 160  
 Cys Pro Lys Ser Gly Ser Ser Gly Gly Ile Cys Glu Lys Ala Tyr Tyr  
 165 170 175  
 Ser Pro Val Gly Lys Lys Asn Ser Lys Leu Tyr Ser Asp Gly Lys Lys  
 180 185 190  
 Lys Glu Ala Asp Leu Val Thr Thr His Glu Leu Gly His Asn Phe Gly  
 195 200 205  
 Ala Glu His Asp Pro Asp Gly Leu Ala Glu Cys Ala Pro Asn Glu Asp  
 210 215 220  
 Gln Gly Gly Lys Tyr Val Met Tyr Pro Ile Ala Val Ser Gly Asp His  
 225 230 235 240  
 Glu Asn Asn Lys Met Phe Ser Asn Cys Ser Lys Gln Ser Ile Tyr Lys  
 245 250 255  
 Thr Ile Glu Ser Lys Ala Gln Glu Cys Phe Gln Glu Arg Ser Asn Lys  
 260 265 270  
 Val Cys Gly Asn Ser Arg Val Asp Glu Gly Glu Glu Cys Asp Pro  
 275 280 285

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 <213> Homo sapiens

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 Thr Thr Ser Ala Glu Lys Asn Thr Cys Gln Leu Tyr Ile Gln Thr Asp  
 20 25 30  
 His Leu Phe Phe Lys Tyr Tyr Gly Thr Arg Glu Ala Val Ile Ala Gln  
 35 40 45

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ile | Ser | Ser | His | Val | Lys | Ala | Ile | Asp | Thr | Ile | Tyr | Gln | Thr | Thr | Asp |  |
| 50  |     |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |  |
| Phe | Ser | Gly | Ile | Arg | Asn | Ile | Ser | Phe | Met | Val | Lys | Arg | Ile | Arg | Ile |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |  |
| Asn | Thr | Thr | Ala | Asp | Glu | Lys | Asp | Pro | Thr | Asn | Pro | Phe | Arg | Phe | Pro |  |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |
| Asn | Ile | Ser | Val | Glu | Lys | Phe | Leu | Glu | Leu | Asn | Ser | Glu | Gln | Asn | His |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |
| Asp | Asp | Tyr | Cys | Leu | Ala | Tyr | Val | Phe | Thr | Asp | Arg | Asp | Phe | Asp | Asp |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |
| Gly | Val | Leu | Gly | Leu | Ala | Trp | Val | Gly | Ala | Pro | Ile | Tyr | Leu | Asn | Ser |  |
|     |     |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |
| Gly | Leu | Thr | Ser | Thr | Ser | Leu | Asn | Thr | Gly | Ile | Ile | Thr | Val | Lys | Asn |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |  |
| Tyr | Gly | Lys | Thr | Ile | Leu | Thr | Lys | Gln | Asn | Tyr | Gly | Ser | His | Val | Pro |  |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |
| Pro | Lys | Val | Ser | His | Ile | Thr | Phe | Ala | His | Glu | Val | Gly | His | Asn | Phe |  |
|     |     |     |     | 180 |     |     |     | 185 |     |     |     |     | 190 |     |     |  |
| Gly | Ser | Pro | His | Asp | Ser | Gly | Thr | Glu | Cys | Thr | Pro | Gly | Glu | Ser | Lys |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |
| Asn | Leu | Gly | Gln | Lys | Glu | Asn | Gly | Asn | Tyr | Ile | Met | Tyr | Ala | Arg | Ala |  |
|     |     |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |
| Thr | Ser | Gly | Asp | Lys | Leu | Asn | Asn | Asn | Lys | Phe | Ser | Leu | Cys | Ser | Ile |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |
| Arg | Asn | Ile | Ser | Gln | Val | Leu | Glu | Lys | Lys | Arg | Asn | Asn | Cys | Phe | Val |  |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |  |
| Glu | Ser | Gly | Gln | Pro | Ile | Cys | Gly | Asn | Gly | Met | Val | Glu | Gln | Gly | Glu |  |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |
| Glu | Cys | Asp | Cys |     |     |     |     |     |     |     |     |     |     |     |     |  |
|     |     | 275 |     |     |     |     |     |     |     |     |     |     |     |     |     |  |

<210> 7

<211> 824

<212> PRT

<213> Homo sapiens

<400> 7

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Met | Arg | Gln | Ser | Leu | Leu | Phe | Leu | Thr | Ser | Val | Val | Pro | Phe | Val | Leu |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |  |
| Ala | Pro | Arg | Pro | Pro | Asp | Asp | Pro | Gly | Phe | Gly | Pro | His | Gln | Arg | Leu |  |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |
| Glu | Lys | Leu | Asp | Ser | Leu | Leu | Ser | Asp | Tyr | Asp | Ile | Leu | Ser | Leu | Ser |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |  |
| Asn | Ile | Gln | Gln | His | Ser | Val | Arg | Lys | Arg | Asp | Leu | Gln | Thr | Ser | Thr |  |
|     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |  |
| His | Val | Glu | Thr | Leu | Leu | Thr | Phe | Ser | Ala | Leu | Lys | Arg | His | Phe | Lys |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |  |
| Leu | Tyr | Leu | Thr | Ser | Ser | Thr | Glu | Arg | Phe | Ser | Gln | Asn | Phe | Lys | Val |  |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |
| Val | Val | Val | Asp | Gly | Lys | Asn | Glu | Ser | Glu | Tyr | Thr | Ala | Lys | Trp | Gln |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |
| Asp | Phe | Phe | Thr | Gly | His | Val | Val | Gly | Glu | Pro | Asp | Ser | Arg | Val | Leu |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |
| Ala | His | Ile | Arg | Asp | Asp | Asp | Val | Ile | Ile | Arg | Ile | Asn | Thr | Asp | Gly |  |
|     |     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |
| Ala | Glu | Tyr | Asn | Ile | Glu | Pro | Leu | Trp | Arg | Phe | Val | Asn | Asp | Thr | Lys |  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 145 |     | 150 |     | 155 |     | 160 |     |     |     |     |     |     |     |     |     |
| Asp | Lys | Arg | Met | Leu | Val | Ser | Lys | Ser | Glu | Asp | Ile | Lys | Asn | Val | Ser |
|     |     | 165 |     | 170 |     | 175 |     |     |     |     |     |     |     |     |     |
| Arg | Leu | Gln | Ser | Pro | Lys | Val | Cys | Gly | Tyr | Leu | Lys | Val | Asp | Asn | Glu |
|     |     | 180 |     | 185 |     | 190 |     |     |     |     |     |     |     |     |     |
| Glu | Leu | Leu | Pro | Lys | Gly | Leu | Val | Asp | Arg | Glu | Pro | Pro | Glu | Glu | Leu |
|     |     | 195 |     | 200 |     | 205 |     |     |     |     |     |     |     |     |     |
| Val | His | Arg | Val | Lys | Arg | Arg | Ala | Asp | Pro | Asp | Pro | Met | Lys | Asn | Thr |
|     |     | 210 |     | 215 |     | 220 |     |     |     |     |     |     |     |     |     |
| Cys | Lys | Leu | Leu | Val | Val | Ala | Asp | His | Arg | Phe | Tyr | Arg | Tyr | Met | Gly |
|     |     | 225 |     | 230 |     | 235 |     |     |     |     |     |     |     |     |     |
| Arg | Gly | Glu | Glu | Ser | Thr | Thr | Thr | Asn | Tyr | Leu | Ile | Glu | Leu | Ile | Asp |
|     |     | 245 |     | 250 |     | 255 |     |     |     |     |     |     |     |     |     |
| Arg | Val | Asp | Asp | Ile | Tyr | Arg | Asn | Thr | Ser | Trp | Asp | Asn | Ala | Gly | Phe |
|     |     | 260 |     | 265 |     | 270 |     |     |     |     |     |     |     |     |     |
| Lys | Gly | Tyr | Gly | Ile | Gln | Ile | Glu | Gln | Ile | Arg | Ile | Leu | Lys | Ser | Pro |
|     |     | 275 |     | 280 |     | 285 |     |     |     |     |     |     |     |     |     |
| Gln | Glu | Val | Lys | Pro | Gly | Glu | Lys | His | Tyr | Asn | Met | Ala | Lys | Ser | Tyr |
|     |     | 290 |     | 295 |     | 300 |     |     |     |     |     |     |     |     |     |
| Pro | Asn | Glu | Glu | Lys | Asp | Ala | Trp | Asp | Val | Lys | Met | Leu | Leu | Glu | Gln |
|     |     | 305 |     | 310 |     | 315 |     |     |     |     |     |     |     |     |     |
| Phe | Ser | Phe | Asp | Ile | Ala | Glu | Glu | Ala | Ser | Lys | Val | Cys | Leu | Ala | His |
|     |     | 325 |     | 330 |     | 335 |     |     |     |     |     |     |     |     |     |
| Leu | Phe | Thr | Tyr | Gln | Asp | Phe | Asp | Met | Gly | Thr | Leu | Gly | Leu | Ala | Tyr |
|     |     | 340 |     | 345 |     | 350 |     |     |     |     |     |     |     |     |     |
| Val | Gly | Ser | Pro | Arg | Ala | Asn | Ser | His | Gly | Gly | Val | Cys | Pro | Lys | Ala |
|     |     | 355 |     | 360 |     | 365 |     |     |     |     |     |     |     |     |     |
| Tyr | Tyr | Ser | Pro | Val | Gly | Lys | Lys | Asn | Ile | Tyr | Leu | Asn | Ser | Gly | Leu |
|     |     | 370 |     | 375 |     | 380 |     |     |     |     |     |     |     |     |     |
| Thr | Ser | Thr | Lys | Asn | Tyr | Gly | Lys | Thr | Ile | Leu | Thr | Lys | Glu | Ala | Asp |
|     |     | 385 |     | 390 |     | 395 |     |     |     |     |     |     |     |     |     |
| Leu | Val | Thr | Thr | His | Glu | Leu | Gly | His | Asn | Phe | Gly | Ala | Glu | His | Asp |
|     |     | 405 |     | 410 |     | 415 |     |     |     |     |     |     |     |     |     |
| Pro | Asp | Gly | Leu | Ala | Glu | Cys | Ala | Pro | Asn | Glu | Asp | Gln | Gly | Gly | Lys |
|     |     | 420 |     | 425 |     | 430 |     |     |     |     |     |     |     |     |     |
| Tyr | Val | Met | Tyr | Pro | Ile | Ala | Val | Ser | Gly | Asp | His | Glu | Asn | Asn | Lys |
|     |     | 435 |     | 440 |     | 445 |     |     |     |     |     |     |     |     |     |
| Met | Phe | Ser | Asn | Cys | Ser | Lys | Gln | Ser | Ile | Tyr | Lys | Thr | Ile | Glu | Ser |
|     |     | 450 |     | 455 |     | 460 |     |     |     |     |     |     |     |     |     |
| Lys | Ala | Gln | Glu | Cys | Phe | Gln | Glu | Arg | Ser | Asn | Lys | Val | Cys | Gly | Asn |
|     |     | 465 |     | 470 |     | 475 |     |     |     |     |     |     |     |     |     |
| Ser | Arg | Val | Asp | Glu | Gly | Glu | Glu | Cys | Asp | Pro | Gly | Ile | Met | Tyr | Leu |
|     |     | 485 |     | 490 |     | 495 |     |     |     |     |     |     |     |     |     |
| Asn | Asn | Asp | Thr | Cys | Cys | Asn | Ser | Asp | Cys | Thr | Leu | Lys | Glu | Gly | Val |
|     |     | 500 |     | 505 |     | 510 |     |     |     |     |     |     |     |     |     |
| Gln | Cys | Ser | Asp | Arg | Asn | Ser | Pro | Cys | Cys | Lys | Asn | Cys | Gln | Phe | Glu |
|     |     | 515 |     | 520 |     | 525 |     |     |     |     |     |     |     |     |     |
| Thr | Ala | Gln | Lys | Lys | Cys | Gln | Glu | Ala | Ile | Asn | Ala | Thr | Cys | Lys | Gly |
|     |     | 530 |     | 535 |     | 540 |     |     |     |     |     |     |     |     |     |
| Val | Ser | Tyr | Cys | Thr | Gly | Asn | Ser | Ser | Glu | Cys | Pro | Pro | Pro | Gly | Asn |
|     |     | 545 |     | 550 |     | 555 |     |     |     |     |     |     |     |     |     |
| Ala | Glu | Asn | Asp | Thr | Val | Cys | Leu | Asp | Leu | Gly | Lys | Cys | Lys | Asp | Gly |
|     |     | 565 |     | 570 |     | 575 |     |     |     |     |     |     |     |     |     |
| Lys | Cys | Ile | Pro | Phe | Cys | Glu | Arg | Glu | Gln | Gln | Leu | Glu | Ser | Cys | Ala |
|     |     | 580 |     | 585 |     | 590 |     |     |     |     |     |     |     |     |     |
| Cys | Asn | Glu | Thr | Asp | Asn | Ser | Cys | Lys | Val | Cys | Cys | Arg | Asp | Leu | Ser |
|     |     | 595 |     | 600 |     | 605 |     |     |     |     |     |     |     |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Arg | Cys | Val | Pro | Tyr | Val | Asp | Ala | Glu | Gln | Lys | Asn | Leu | Phe | Leu |
| 610 |     |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Arg | Lys | Gly | Lys | Pro | Cys | Thr | Val | Gly | Phe | Cys | Asp | Met | Asn | Gly | Lys |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Cys | Glu | Lys | Arg | Val | Gln | Asp | Val | Ile | Glu | Arg | Phe | Trp | Asp | Phe | Ile |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Asp | Gln | Leu | Ser | Ile | Asn | Thr | Phe | Gly | Lys | Phe | Leu | Ala | Asp | Asn | Ile |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Val | Gly | Ser | Val | Leu | Val | Phe | Ser | Leu | Ile | Phe | Trp | Ile | Pro | Phe | Ser |
|     |     |     | 675 |     |     |     | 680 |     |     |     |     |     | 685 |     |     |
| Ile | Leu | Val | His | Cys | Val | Asp | Lys | Lys | Leu | Asp | Lys | Gln | Tyr | Glu | Ser |
|     |     |     | 690 |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Leu | Ser | Leu | Phe | His | Pro | Ser | Asn | Val | Glu | Met | Leu | Ser | Ser | Met | Asp |
| 705 |     |     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |
| Ser | Ala | Ser | Val | Arg | Ile | Ile | Lys | Pro | Phe | Pro | Ala | Pro | Gln | Thr | Pro |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |
| Gly | Arg | Leu | Gln | Pro | Ala | Pro | Val | Ile | Pro | Ser | Ala | Pro | Ala | Ala | Pro |
|     |     |     | 740 |     |     |     |     | 745 |     |     |     |     | 750 |     |     |
| Lys | Leu | Asp | His | Gln | Arg | Met | Asp | Thr | Ile | Gln | Glu | Asp | Pro | Ser | Thr |
|     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
| Asp | Ser | His | Met | Asp | Glu | Asp | Gly | Phe | Glu | Lys | Asp | Pro | Phe | Pro | Asn |
|     |     |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |
| Ser | Ser | Thr | Ala | Ala | Lys | Ser | Phe | Glu | Asp | Leu | Thr | Asp | His | Pro | Val |
| 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |
| Ala | Arg | Ser | Glu | Lys | Ala | Ala | Ser | Phe | Lys | Leu | Gln | Arg | Gln | Asn | Arg |
|     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
| Val | Asn | Ser | Lys | Glu | Thr | Glu | Cys |     |     |     |     |     |     |     |     |
|     |     |     | 820 |     |     |     |     |     |     |     |     |     |     |     |     |

<210> 8

<211> 477

<212> PRT

<213> Homo sapiens

<400> 8

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Arg | Gln | Ser | Leu | Leu | Phe | Leu | Thr | Ser | Val | Val | Pro | Phe | Val | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Ala | Pro | Arg | Pro | Pro | Asp | Asp | Pro | Gly | Phe | Gly | Pro | His | Gln | Arg | Leu |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Glu | Lys | Leu | Asp | Ser | Leu | Leu | Ser | Asp | Tyr | Asp | Ile | Leu | Ser | Leu | Ser |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Asn | Ile | Gln | Gln | His | Ser | Val | Arg | Lys | Arg | Asp | Leu | Gln | Thr | Ser | Thr |
|     |     |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| His | Val | Glu | Thr | Leu | Leu | Thr | Phe | Ser | Ala | Leu | Lys | Arg | His | Phe | Lys |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Leu | Tyr | Leu | Thr | Ser | Ser | Thr | Glu | Arg | Phe | Ser | Gln | Asn | Phe | Lys | Val |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Val | Val | Val | Asp | Gly | Lys | Asn | Glu | Ser | Glu | Tyr | Thr | Val | Lys | Trp | Gln |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asp | Phe | Phe | Thr | Gly | His | Val | Val | Gly | Glu | Pro | Asp | Ser | Arg | Val | Leu |
|     |     |     | 115 |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Ala | His | Ile | Arg | Asp | Asp | Asp | Val | Ile | Ile | Arg | Ile | Asn | Thr | Asp | Gly |
|     |     |     |     |     | 135 |     |     |     |     |     |     | 140 |     |     |     |
| Ala | Glu | Tyr | Asn | Ile | Glu | Pro | Leu | Trp | Arg | Phe | Val | Asn | Asp | Thr | Lys |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Asp | Lys | Arg | Met | Leu | Val | Tyr | Lys | Ser | Glu | Asp | Ile | Lys | Asn | Val | Ser |



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
|     |     |     |     | 165 |     |     |     | 170 |     |     |     | 175 |     |     |     |  |
| Arg | Leu | Gln | Ser | Pro | Lys | Val | Cys | Gly | Tyr | Leu | Lys | Val | Asp | Asn | Glu |  |
|     |     |     |     | 180 |     |     |     | 185 |     |     |     | 190 |     |     |     |  |
| Glu | Leu | Leu | Pro | Lys | Gly | Leu | Val | Asp | Arg | Glu | Pro | Pro | Glu | Glu | Leu |  |
|     |     |     |     | 195 |     |     |     | 200 |     |     |     | 205 |     |     |     |  |
| Val | His | Arg | Val | Lys | Arg | Arg | Ala | Asp | Pro | Asp | Pro | Met | Lys | Asn | Thr |  |
|     |     |     |     | 210 |     |     |     | 215 |     |     |     | 220 |     |     |     |  |
| Cys | Lys | Leu | Leu | Val | Val | Ala | Asp | His | Arg | Phe | Tyr | Arg | Tyr | Met | Gly |  |
| 225 |     |     |     |     | 230 |     |     |     | 235 |     |     |     | 240 |     |     |  |
| Arg | Gly | Glu | Glu | Ser | Thr | Thr | Thr | Asn | Tyr | Leu | Ile | Glu | Leu | Ile | Asp |  |
|     |     |     |     | 245 |     |     |     | 250 |     |     |     | 255 |     |     |     |  |
| Arg | Val | Asp | Asp | Ile | Tyr | Arg | Asn | Thr | Ser | Trp | Asp | Asn | Ala | Gly | Phe |  |
|     |     |     |     | 260 |     |     |     | 265 |     |     |     | 270 |     |     |     |  |
| Lys | Gly | Tyr | Gly | Ile | Gln | Ile | Glu | Gln | Ile | Arg | Ile | Leu | Lys | Ser | Pro |  |
|     |     |     |     | 275 |     |     |     | 280 |     |     |     | 285 |     |     |     |  |
| Gln | Glu | Val | Lys | Pro | Gly | Glu | Lys | His | Tyr | Asn | Met | Ala | Lys | Ser | Tyr |  |
|     |     |     |     | 290 |     |     |     | 295 |     |     |     | 300 |     |     |     |  |
| Pro | Asn | Glu | Glu | Lys | Asp | Ala | Trp | Asp | Val | Lys | Met | Leu | Leu | Glu | Gln |  |
| 305 |     |     |     |     | 310 |     |     |     | 315 |     |     |     | 320 |     |     |  |
| Phe | Ser | Phe | Asp | Ile | Ala | Glu | Glu | Ala | Ser | Lys | Val | Cys | Leu | Ala | His |  |
|     |     |     |     | 325 |     |     |     | 330 |     |     |     | 335 |     |     |     |  |
| Leu | Phe | Thr | Tyr | Gln | Asp | Phe | Asp | Met | Gly | Thr | Leu | Gly | Leu | Ala | Tyr |  |
|     |     |     |     | 340 |     |     |     | 345 |     |     |     | 350 |     |     |     |  |
| Val | Gly | Ser | Pro | Arg | Ala | Asn | Ser | His | Gly | Gly | Val | Cys | Pro | Lys | Ala |  |
|     |     |     |     | 355 |     |     |     | 360 |     |     |     | 365 |     |     |     |  |
| Tyr | Tyr | Ser | Pro | Val | Gly | Lys | Lys | Asn | Ile | Tyr | Leu | Asn | Ser | Gly | Leu |  |
|     |     |     |     | 370 |     |     |     | 375 |     |     |     | 380 |     |     |     |  |
| Thr | Ser | Thr | Lys | Asn | Tyr | Gly | Lys | Thr | Ile | Leu | Thr | Lys | Glu | Ala | Asp |  |
| 385 |     |     |     |     | 390 |     |     |     | 395 |     |     |     | 400 |     |     |  |
| Leu | Val | Thr | Thr | His | Glu | Leu | Gly | His | Asn | Phe | Gly | Ala | Glu | His | Asp |  |
|     |     |     |     | 405 |     |     |     | 410 |     |     |     | 415 |     |     |     |  |